BUS1205 MATHEMATICS II FOR COMPUTER STUDIES

ASSIGNMENT-1 WORTH 8% OF FINAL GRADES

WRITE ALL THE ANSWERS SHOWING ALL STEPS AND CALCUALTIONS

TOTAL MARKS-80 (EACH QUESTION 10 MARKS)

1. Let p, q, and r be the propositions

p : Grizzly bears have been seen in the area.

q : Hiking is safe on the trail.

r : Berries are ripe along the trail.

Write these propositions using p, q, and r and logical connectives (including negations).

a) Berries are ripe along the trail, but grizzly bears have not been seen in the area.
b) Grizzly bears have not been seen in the area and hiking on the trail is safe, but berries are ripe along the trail.
c) If berries are ripe along the trail, hiking is safe if and only if grizzly bears have not been seen in the area.
d) It is not safe to hike on the trail, but grizzly bears have not been seen in the area and the berries along the trail are ripe.
e) For hiking on the trail to be safe, it is necessary but not sufficient that berries not be ripe along the trail and for grizzly bears not to have been seen in the area.
f) Hiking is not safe on the trail whenever grizzly bears have been seen in the area and berries are ripe along the trail.

2. Write each of these statements in the form “if p, then q” in English. [Hint: Refer to the list of common ways to express conditional statements.]

a) It snows whenever the wind blows from the northeast.

b) The apple trees will bloom if it stays warm for a week.

c) That the Pistons win the championship implies that they beat the Lakers.

d) It is necessary to walk 8 miles to get to the top of Long’s Peak.

e) To get tenure as a professor, it is sufficient to be worldfamous.

f) If you drive more than 400 miles, you will need to buy gasoline.

g) Your guarantee is good only if you bought your CD player less than 90 days ago.

h) Jan will go swimming unless the water is too cold

3. Construct a truth table for each of these compound propositions.

a) $p \rightarrow (\neg q \vee r)$

b) $\neg p \rightarrow (q \rightarrow r)$

c) $(p \rightarrow q) \vee (\neg p \rightarrow r)$

d) $(p \rightarrow q) \wedge (\neg p \rightarrow r)$

e) $(p \leftrightarrow q) \vee (\neg q \leftrightarrow r)$

f) $(\neg p \leftrightarrow \neg q) \leftrightarrow (q \leftrightarrow r)$

4. Let the universal set be the set R of all real numbers and let $A = \{x \in R \mid -3 \leq x \leq 0\}$, $B = \{x \in R \mid -1 < x < 2\}$, and $C = \{x \in R \mid 6 < x \leq 8\}$.

Find each of the following:

a. $A \cup B$

b. $A \cap B$

c. A^c

d. $A \cup C$

e. $A \cap C$

f. B^c

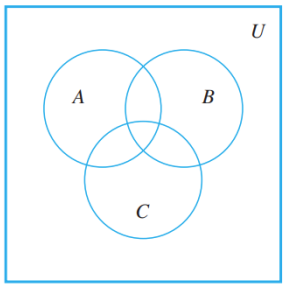
g. $A^c \cap B^c$

h. $A^c \cup B^c$

i. $(A \cap B)^c$

j. $(A \cup B)^c$

5. Consider the Venn diagram shown below.



For each of (a)–(f), copy the diagram and shade the region corresponding to the indicated set.

a. $B \cup C$

b. A^c

c. $A - (B \cup C)$

d. $(A \cup B)^c$

e. $A^c \cap B^c$

6. For all x, y, and z in B, if $x + y = x + z$ and $x \cdot y = x \cdot z$, then prove $y = z$.

7. Use a table to express the values of each of these Boolean functions.

a) $F(x, y, z) = xy$

b) $F(x, y, z) = x + yz$

c) $F(x, y, z) = xy + (xyz)$

d) $F(x, y, z) = x(yz + y z)$

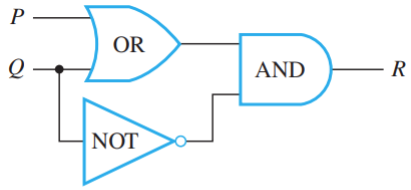
8.For the circuits in 1 & 2 if the input signals are as indicated.

a)Find the output signal for each

b)Write an input/output table for the circuit.

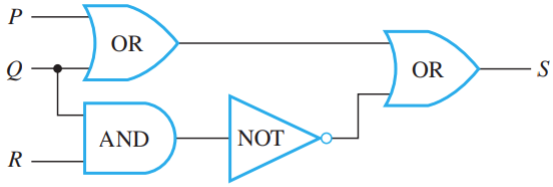
c)Find the Boolean expression that corresponds to the circuit

1)



input signals: $P = 1$ and $Q = 0$

2)



input signals: $P = 0$, $Q = 0$, $R = 0$